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7/21/1986

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PROCEDURE FOR THE DETERMINATION OF THE COMPATIBILITY & CONSOLIDATION OF WASTES FOR BLENDING

RECEIVED
JUL 21 1986
WASTE MANAGEMENT BRANCH

Approved By:

Regulatory Affairs: D. Stefani

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Laboratory: D. Grayson

PROCEDURE FOR THE DETERMINATION OF THE COMPATIBILITY & CONSOLIDATION OF WASTES FOR BLENDING

STEP 1:

Collect a representative sample of each drum.

SUPPLIES
Disposable collection tube - (7/8" diameter - 1/2" diameter)
Fitted stopper
Sample bottle (250 ml) or beaker
Label
Marker

Vent drum before removing bung. Use glass collection tube to collect representative sample. Place tube into drum until it reaches the bottom. Lift tube approximately 1/2 - 1 inch off the bottom. Place stopper in tube until it fits snuggly. Remove sampling tubing and place unstoppered tip in collection container. Remove stopper, cap container. Label, date, sign and number container with the same number on the drum being sample.

STEP 2:

Review manifest and waste profile sheets, match appearance of waste and characteristics indicated on waste profile sheet. If there are differences between the physical appearance of the drum sample and the waste profile sheet, indicate them on the fingerprint log sheet. (See Appendix I)

STEP 3:

Perform the physical tests indicated on the fingerprint form.

STEP 4:

Segregate drums into compatible waste streams using the 1. fingerprint analysis (pH, % solids, type of material, etc.) and the compatibility chart attached (see Appendix II*) as guidelines.

*Extracted from CFR 40 Sec. 265 Appendix V.

Approved By:

Regulatory Affairs:

Operations:

Laboratory:

STEP 5:

Record drum numbers of desired blending on fingerprint information form.

STEP 6:

After fingerprint tests have been completed, obtain one quart samples of drums to be tested for compatibility.

Place sample with highest pH, or sample with a pH closest to 7 (on the basic side) in mixing vat. Add other sample to vat approximately 20 ml at a time and blend for 1 minute before next addition. Observe reaction and record on fingerprint form. Check for:

- Change in temperature
- Gas evolution
- Precipitation
- Color change
- pH

Observe samples every ten to fifteen minutes, for one hour prior to making conclusions about compatibility. If there are no significant severe reactions, the rate of addition may be increased, as well as the volume. Record observations of reactions every 15 minutes for one hour. Record final rate of addition on fingerprint form. This will provide information for blending in tanks.

Blending in Tanks

A working rate of addition should be obtained after fingerprint and compatibility tests are run, for blending larger volumes in tanks.

A compatibility test shall be run for each drum or container added to the tank.

LOG SHEET

FINGERPRINT FOR DRUM #_____

DATE:
TIME:
GENERATOR:
WASTE:
MAJOR CONSTITUENTS:

PHYSICAL TESTS

pH_____ Layers(#)_____
color_____ Free CN- _____
odor_____ H2S _____

Blended With Drum #_____
_____
_____

Reaction Time Allowed _____ Minutes

Results & Observations:

APPENDIX I

HAZARDOUS WASTE MANAGEMENT GUIDE

SECTION XXI-A. DESCRIPTION OF WASTE

Use as many line numbers as are needed to describe the waste.

SECTION XXI-C. HANDLING CODE

Enter the handling code which describes the status of the waste on the date the report is filed.

SECTION XXI-D. AMOUNT OF WASTE

Enter the amount of waste received, rather than a total annual aggregate.

SECTION XXII. COMMENTS

a. Enter the EPA Identification number, name, and address of the transporter, if known. If the transporter is not known to you, enter the name and chauffeur license number of the driver and the State and license number of the transporting vehicle which presented the waste to your facility, if known.

b. Enter an explanation of how the waste movement was presented to your facility; why you believe the waste is hazardous; and how your facility plans to manage the waste. Continue on a separate blank sheet of paper if additional space is needed.

MONITORING DATA

Do not attach monitoring data.

APPENDIX III
EPA INTERIM PRIMARY DRINKING WATER STANDARDS

Parameter	Maximum level (mg/l)
Arsenic	0.05
Barium	1.0
Cadmium	0.01
Chromium	0.05
Fluoride	1.4-2.4
Lead	0.05
Mercury	0.002
Nitrate (as N)	10
Selenium	0.01
Silver	0.05
Endrin	0.0002
Lindane	0.004
Methoxychlor	0.1
Toxaphene	0.005
2,4-D	0.1
2,4,5-TP Silver	0.01
Radium	5 pCl/1
Gross Alpha	15 pCl/1
Gross Beta	4 millirem/yr
Turbidity	1/TU
Coliform Bacteria	1/100 ml

[*Comment:* Turbidity is applicable only to surface water supplies.]

APPENDIX IV
TESTS FOR SIGNIFICANCE

As required in § 265.93(b) the owner or operator must use the Student's t-test to determine statistically significant changes in the concentration or value of an indicator parameter in periodic ground-water samples when compared to the initial background concentration or value of that indicator parameter. The comparison must consider individually each of the wells in the monitoring system. For three of the indicator parameters (specific conductance, total organic carbon, and total organic halogen) a single-tailed Student's t-test must be used to test at the 0.01 level of significance for significant increases over background. The difference test for pH must be a two-tailed Student's t-test at the overall 0.01 level of significance.

The student's t-test involves calculation of the value of a t-statistic for each comparison of the mean (average) concentration or value (based on a minimum of four replicate measurements) of an indicator parameter with its initial background concentration or value. The calculated value of the t-statistic must then be compared to the value of the t-statistic found in a table for t-test of significance at the specified level of significance. A calculated value of t which exceeds the value of t found in the table indicates a statistically significant change in the concentration or value of the indicator parameter.

Formulae for calculation of the t-statistic and tables for t-test of significance can be found in most introductory statistics texts.

APPENDIX V
EXAMPLES OF POTENTIALLY INCOMPATIBLE WASTE

Many hazardous wastes, when mixed with other waste or materials at a hazardous waste facility, can produce effects which are harmful to human health and the environment, such as (1) heat or pressure, (2) fire or explosion, (3) violent reaction, (4) toxic dusts, mists, fumes, or gases, or (5) flammable fumes or gases.

Below are examples of potentially incompatible wastes, waste components, and materials, along with the harmful consequences which result from mixing materials in one group with materials in another group. The list is intended as a guide to owners or operators of treatment, storage, and disposal facilities, and to enforcement and permit granting officials, to indicate the need for special precautions when managing these potentially incompatible waste materials or components.

This list is not intended to be exhaustive. An owner or operator must, as the regulations require, adequately analyze his wastes so that he can avoid creating uncontrolled substances or reactions of the type listed below, whether they are listed below or not.

It is possible for potentially incompatible wastes to be mixed in a way that precludes a reaction (e.g., adding acid to water rather than water to acid) or that neutralizes them (e.g., a strong acid mixed with a strong base), or that controls substances produced (e.g., by generating flammable gases in a closed tank equipped so that ignition cannot occur, and burning the gases in an incinerator).

In the lists below, the mixing of a Group A material with a Group B material may have the potential consequence as noted.

Group 1-A

Acetylene sludge
Alkaline caustic liquids
Alkaline cleaner
Alkaline corrosive liquids
Alkaline corrosive battery fluid
Caustic wastewater
Lime sludge and other cor-

Group 1-B

Acid sludge
Acid and water
Battery acid
Chemical cleaners
Electrolyte, acid
Etching acid liquid or

HAZARDOUS WASTE MANAGEMENT GUIDE

rosive alkalies
Lime wastewater
Lime and water
Spent caustic

solvent
Pickling liquor and other corrosive acids
Spent acid
Spent mixed acid
Spent sulfuric acid

Potential consequences: Heat generation; violent reaction.

Group 2-A	Group 2-B
Aluminum	Any waste in Group 1-A or 1-B
Beryllium	
Calcium	
Lithium	
Magnesium	
Potassium	
Sodium	
Zinc powder	
Other reactive metals and metal hydrides	

Potential consequences: Fire or explosion; generation of flammable hydrogen gas.

Group 3-A	Group 3-B
Alcohols	Any concentrated waste in Groups 1-A or 1-B
Water	Calcium
	Lithium
	Metal hydrides
	Potassium
	SO_2Cl_2, $SOCl_2$, PCl_3, CH_3SiCl_3
	Other water-reactive waste

Potential consequences: Fire, explosion, or heat generation; generation of flammable or toxic gases.

Group 4-A	Group 4-B
Alcohols	Concentrated Group 1-A or 1-B wastes
Aldehydes	Group 2-A wastes
Halogenated hydrocarbons	
Nitrated hydrocarbons	
Unsaturated hydrocarbons	
Other reactive organic compounds and solvents	

Potential consequences: Fire, explosion, or violent reaction.

Group 5-A	Group 5-B
Spent cyanide and sulfide solutions	Group 1-B wastes

Potential consequences: Generation of toxic hydrogen cyanide or hydrogen sulfide gas.

Group 6-A	Group 6-B
Chlorates	Acetic acid and other organic acids
Chlorine	Concentrated mineral acids
Chlorites	Group 2-A wastes
Chromic acid	Group 4-A wastes
Hyphochlorites	Other flammable and combustible wastes
Nitrates	
Nitric acid, fuming	
Perchlorates	
Permanganates	
Peroxides	
Other strong oxidizers	

Potential consequences: Fire, explosion, or violent reaction.

Source: "Law, Regulations, and Guidelines for Handling of Hazardous Waste."

California Department of Health, February 1975.

Total transport index	Minimum separation distances in feet to nearest undeveloped film for various times of transit					Minimum distance in feet to area of persons, or minimum distance in feet from dividing partition of cargo compartments
	Up to 2 hours	2—4 hours	4—8 hours	8—12 hours	Over 12 hours	
None	0	0	0	0	0	0
0.1 to 1.0	1	2	3	4	5	1
1.1 to 5.0	3	4	6	8	11	2
5.1 to 10.0	4	6	9	11	15	3
10.1 to 20.0	5	8	12	16	22	4
20.1 to 30.0	7	10	15	20	29	5
30.1 to 40.0	8	11	17	22	33	6
40.1 to 50.0	9	12	19	24	36	7

NOTE 1: The distance in the table must be measured from the nearest point on the packages of radioactive materials.

(c) Shipments of low specific activity materials, as defined in §173.403 of this subchapter, must be loaded so as to avoid spillage and scattering of loose materials. Loading restrictions are set forth in §173.425 of this subchapter.

(d) Packages must be so blocked and braced that they cannot change position during conditions normally incident to transportation.

(e) Persons should not remain unnecessarily in a vehicle containing radioactive materials.

(f) Each fissile class III radioactive material shipment (as defined in §173.455(a)(3) of this subchapter) must be transported in accordance with one of the methods prescribed in §173.457 of this subchapter. The transport controls must be adequate to assure that no fissile class III shipment is transported in the same transport vehicle with any other fissile radioactive material shipment. In loading and storage areas each fissile class III shipment must be segregated by a distance of at least 20 feet from other packages required to bear one of the "Radioactive" labels described in §172.403 of this subchapter.

(g) For shipments transported under exclusive use conditions the radiation dose rate must not exceed 2 millirem per hour in any position normally occupied in the motor vehicle. For shipments transported as exclusive use under the provisions of §173.441(b) for packages with external radiation levels in excess of 200 millirem per hour at the package surface, the motor vehicle must meet the requirements of a closed transport vehicles (§173.403 of this subchapter).

§177.843 Contamination of vehicles.

(a) Each motor vehicle used for transporting radioactive materials under exclusive use conditions in accordance with §§173.425 (c) or 173.443(c) shall be surveyed with radiation detection instruments after each use. A vehicle may not be returned to service until the radiation dose rate at each accessible surface is 0.5 millirem per hour or less and the removable (non-fixed) radioactive surface contamination is not greater than the level prescribed in §173.443(a).

(b) This section does not apply to any vehicle used solely for transporting radioactive material if a survey of the interior surface shows that the radiation dose rate does not exceed 10 millirem per hour at the interior surface or 2 millirem per hour at 3 feet from any interior surface. These vehicles must be stenciled with the words "For Radioactive Materials Use Only" in lettering at least 3 inches high in a conspicuous place,on both sides of the exterior of the vehicle. These vehicles must be kept closed at all times other than loading and unloading.

(c) In case of fire, accident, breakage, or unusual delay involving shipments of radioactive material, see §177.861.

§177.844 Other regulated materials.

Asbestos must be loaded, handled, and unloaded, and any asbestos contamination of transport vehicles removed, in a manner that will minimize occupational exposure to airborne asbestos particles released incident to transportation. (See §173.1090 of this subchapter).

Subpart C — Loading and Storage Chart of Hazardous Materials.

§ 177.848 Loading and storage chart of hazardous materials.

(a) Charged electric storage batteries must not be loaded in the same vehicle with explosives, class A.

(b) Cyanides or cyanide, mixtures must not be loaded or stored with acids or corrosive liquids.

(c) Gas identification sets may be loaded and transported with all articles named in the segregation and separation chart, except those in column c.

(d) Nitric acid, when loaded in the same motor vehicle with other corrosive liquids in carboys, must be separated from the other carboys. A 2 by 6 inch plank set on edge, should be nailed across the motor vehicle floor at least 12 inches from the nitric acid carboys, and the space between the plank and the carboys of nitric acid should be filled with sand, sifted ashes, or other incombustible absorbent material.

(e) Smokeless powder for small arms in quantities not exceeding 100 pounds net weight in one motor vehicle shall be classed as a flammable solid for purposes of transportation when examined for this classification by the Bureau of Explosives and approved by the Associate Director for HMR.

(f) Hazardous materials must not be loaded, transported, or stored together, except as provided in the following table:

Segregation and Separation Chart of Hazardous Materials

Footnotes

1. Detonators, class C explosives, may also be loaded and transported with articles named in columns 3, 9, 11, 12, 13, and 14. Loading and transportation of detonating primers, or detonators, except as prescribed in §177.835, in any quantity with articles named in columns b, c, e, or f is prohibited.

2. Corrosive liquids must not be loaded above or adjacent to flammble solids, oxidizing materials, ammunition for cannon with or without projectiles, or propellant explosives, except that shippers loading truckload shipments of corrosive liquids and flammable solids or oxidizing materials packages and who have obtained prior approval from the Department may load such materials together when it is known that the mixture of contents would not cause a dangerous evoluation of heat or gas.

3. Explosives, class A, and explosives, class B must not be loaded or stored with chemical ammunition containing incendiary charges or white phosphorus either with or without bursting charges.

4. Bursters (explosive), boosters (explosive), or supplementary charges (explosive) without detonators when shipped by, to, or for the Departments of the Army, Navy, and Air Force of the United States Government may be loaded with any of the articles named except those in columns c, d, 3, 9, 11, 12, 13, 14, 15 and 16.

5. Does not include blasting agents, ammonium nitrate-fuel oil mixtures, ammonium nitrate, fertilizer grade, which may be loaded, transported, or stored with high explosives, or with dentonators containing not more than 1 gram of explosive each, excluding ignition and delay charges.

6. Normal uranium depleted uranium, and thorium metal in solid form may also be loaded and transported with articles named in columns a, b, c, d, e, f, and g.

Instructions

The letter X at an intersection shows that these materials must not be loaded or stored together. Example: Detonating fuzes, class A, with or without radioactive components, (g), must not be loaded or stored with high explosives or propellant explosives, (b).

		a	b	c	d	e	f	g	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
CLASS A EXPLOSIVES	Low explosives or black powder																							
	High explosives or propellant explosives																							
	Initiating or priming explosives, wet; Diazodinitrophenol; fulminate of mercury; guanyl nitrosamino guanylidene hydrazine; lead azide; lead styphnate; nitro mannite; nitrosoguanidine; pentaerythrite tetranitrate; tetrazene; lead mononitroresorcinate	X	X																					
	Detonators, detonating primers	[1]X	X		d																			
	Ammunition for cannon with explosive projectiles, gas projectiles, smoke projectiles, incendiary projectiles, illuminating projectiles, ammunition for small-arms with explosive projectiles, incendiary projectiles; rocket ammunition with explosive projectiles, gas projectiles, smoke projectiles, incendiary projectiles, illuminating projectiles; boosters (explosive); bursters (explosive); and supplementary charges (explosive) without detonators, 3/, 4/.		X	X		e																		
	Explosive projectiles, bombs, torpedoes, mines, rifle or hand grenades (explosive), jet thrust units (jato), igniters, jet thrust rocket motors, igniters rocket motor, 3/.		X	X			f																	
	Detonating fuzes, class A explosives, with or without radioactive components	X	X					g																
CLASS B EXPLOSIVES	Ammunition for cannon with empty, inert-loaded or solid projectiles; or without projectiles; rocket ammunition with empty projectiles; inert-loaded or solid projectiles or without projectiles		X						1															
	Propellant explosives, jet thrust units (jato), igniters, jet thrust rocket motors, rocket engines (liquid), igniters, rocket motor, starter cartridges		X							2														
CLASS C EXPLOSIVES	Fireworks, special or railway torpedoes		X	[1]X			X	X	X		3													
	Small arms ammunition, or cartridges, practice ammunition		X									4												
	Primers for cannon or small arms, empty cartridge bags—black powder ingiters, empty cartridge cases, primed, empty grenades, primed, combination primers or percussion caps, toy caps, explosive cable cutters, explosive rivets		X										5											
	Percussion fuzes, tracer fuzes or tracers		X											6										
	Time, combination or detonating fuzes		X												7									
	Cordeau detonant fuze, safety squibs, fuse lighters, fuse igniters, delay electric igniters, electric squibs, instantaneous fuse or igniter cord		X													8								
	Fireworks, common	[1]X	X				X	X	X								9							
OTHER HAZARDOUS MATERIALS	Blasting agent; blasting agent label.		X							X								10						
	Flammable liquids or flammable gases; flammable liquid or flammble gas label.	[1]X	X				X	X	X										11					
	Flammable solids; flammable solid label. Oxidizer; oxidizer label Organic peroxide; organic peroxide label.	[1,5]X	X				X	X	X											12				
	Corrosive liquids; corrosive label.	[2]X	X				X	X	X			X	X								13			
	Nonflammable gases; N.F.G. label.	[1]X	X				X	X	X													14		
	Poisonous gases or liquids in tank car tanks, cylinders, projectiles or bombs; poison gas labels.	X	X	X			X	X	X			X	X										15	
	Radioactive materials; radioactive label.	[6]X	[6]X	[6]X			[6]X	[6]X	[6]X															16